The National Energy Technology Laboratory's 2015 Crosscutting Technology Research Review Meeting Program Agenda

Sheraton Hotel at Station Square
Pittsburgh, PA

Bridging basic and applied research in fossil energy sensors and controls; simulation-based engineering; high-performance materials and other innovative concepts in advanced power generation

APRIL 27 - 30, 2015

Welcome to NETL

DR. SEAN PLASYNSKI

Sean Plasynski is the Director of NETL's Strategic Center for Coal. In this role, Dr. Plasynski provides strategic direction, oversight, and management for NETL's Clean Coal Research Program, which includes research, development, demonstration, and deployment of advanced technologies to improve the efficiency and environmental performance of coal utilization. Dr. Plasynski has held numerous management and technical positions over his 25-year career at NETL, including Director of the Office of Coal and Power R&D and Sequestration Technology Manager. He has been involved in a wide spectrum of energy technology development, including advanced power and environmental systems, solids transport, biomass co-firing, and carbon capture and storage. Dr. Plasynski has also served on a team addressing critical U.S. infrastructure vulnerabilities for homeland security. He holds a B.S., M.S., and Ph.D. in chemical engineering from the University of Pittsburgh and an MBA from the University of Pittsburgh's Katz Graduate School of Business.

MR. REGIS CONRAD

Regis Conrad has been with the Department of Energy for 10 years currently in the position of Director of the Advance Energy Systems overseeing RD&D of the Advanced Combustion, Gasification, Advanced Turbines, Fuel Cell, Coal and Coal Biomass to Liquids and Supercritical CO2 power cycles. In addition he oversees the Crosscutting Research and Fossil Energy's SBIR programs. Previous to DOE he worked for the Department of the Navy at the Carderock Warfare Center as a Program Manager overseeing applied research of materials for topside systems on board Navy vessels. He also worked for the U.S. Bureau of Mines conducting fundamental research on carbon steels, stainless steels, high nickel alloys and composite materials.

DR. ROBERT ROMANOSKY

Dr. Robert Romanosky received both his M.S. and Ph.D. from West Virginia University in analytical chemistry/instrumentation. He has been with the U.S. Department of Energy, National Energy Technology Laboratory, since 1978, spending 18 years working in areas involved in all aspects of both laboratory and process research dealing with advanced instrumentation and process analysis on power systems. For the next 17 years, Dr. Romanosky was the Technology Manager for Power Systems Advanced Crosscutting Research. This technology area encompasses research activities in Advanced Materials, Plant Optimization Technologies, Advanced Systems Modeling, Coal Utilization Sciences, and University Training and Research. Dr. Romanosky is currently the Deputy Director, Office of Coal and Power R&D at the National Energy Technology Laboratory. The Office of Coal and Power R&D has responsibility for the Carbon Capture, Gasification, Turbine, Fuel Cell, Carbon Storage, Crosscutting, and Advanced Combustion Programs.

DR. WILLIAM H. PETER

Dr. William Peter is the Deputy Director of the Manufacturing Demonstration Facility at Oak Ridge National Laboratory. He has been the principal investigator for over 20 R&D projects including research in the areas of powder metallurgy of titanium powders, the fabrication of amorphous/nanocrystalline materials, and the processing of other lightweight alloys. He has studied the fabrication and/or degradation of aluminum, zirconium, and iron based amorphous and nanocrystalline materials for over 11 years. Dr. Peter has investigated the consolidation and evaluation of titanium powders for 7 years in the areas of roll compaction of titanium powder to make sheet, the net shape consolidation of titanium for aircraft components, forging of consolidated powder, and the direct manufacturing of titanium parts using electron beam deposition. He has also been the Principal Investigator for projects evaluating the formability of both titanium and magnesium sheet. In 2007, Dr. Peter was part of a team to win the R&D 100 Magazine award for their work in powder production and consolidation of new titanium powders. In 2012, Dr. Peter was awarded three R&D 100 Magazine awards including additive manufacturing of robotics, development of a roll mill technology, and the development of laser-fused NanoSHIELD coatings. Dr. Peter received his B.E. from Vanderbilt University in 1996, and his M.S. and Ph.D. from the University of Tennessee in 2002 and 2005, respectively.

MR. BRUCE R. GEIL

Mr. Geil is currently the acting Associate Director for Budget and Operations in the Sensors and Electron Devices Directorate (SEDD) where he leads SEDDs budget execution and operations. His position of record is the branch chief of the Power Conditioning branch in the Energy and Power division at the Army Research Laboratory. The branch is primarily focused on technologies to improve the performance of power systems through the development of power devices, power conversion, pulse power and HEMP protection components with the primary focus on platform and tactical energy networks. Mr. Geil has 32 years experience at the Army Research Laboratory, in the design, fabrication and packaging of semiconductor devices and holds a Bachelor's of Science in mechanical engineering from the University of Maryland Baltimore County and a Master's of Science in electrical engineering from the University of Maryland. His primary areas of research before becoming branch chief included MEMS device development for power systems, wide band gap device fabrication, high temperature packaging technologies, and thermal management of power modules. In 2006 Mr. Geil deployed to Iraq to evaluate power requirements and performance of an ARL developed counter IED system.

MR. ERIK SHUSTER

Erik Shuster is an energy analyst and engineer at the Department of Energy's National Energy Technology Laboratory (NETL). He has thirteen years of experience with systems analysis and modeling of advanced power generating systems, coal to liquids, water requirements for thermoelectric power generation, and strategic energy analyses and planning. Mr. Shuster has provided technical support to NETL's Carbon Capture & Sequestration and Gasification program areas. He currently works in the Office of Program Performance and Benefits where he supports NETL's Crosscutting Technology Research program through modeling and analysis efforts and is involved in the Water/Energy nexus. Erik has a master's degree in chemical engineering from the University of Pittsburgh.

2015 CCR Project Review Meeting Agenda

MONDAY APRIL 27

8:00 a.m **Registration– Grand Station 3 Foyer** **Continental Breakfast – Grand Station 3, 4, & 5**

Plenary Session 1 - Grand Station 1 & 2

9:00 a.m. **Dr. Sean I. Plasynski**
Director, Strategic Center for Coal - National Energy Technology Laboratory

Mr. Regis Conrad
Director, Division of Advanced Energy Systems - U.S. Department of Energy

Dr. Robert Romanosky
Deputy Director, Office of Coal and Power R&D - National Energy Technology Laboratory

10:00 a.m. **MORNING BREAK – Grand Station 3, 4, & 5**

Track A High Performance Materials - Grand Station 1 & 2

10:30 a.m. **SESSION 2 – ADVANCED MANUFACTURING MATERIALS**
Moderator – *Richard Dunst*, National Energy Technology Laboratory

- **Mechanically Activated Combustion Synthesis of $MOSi_2$-Based Composites**
  Evgeny Shafirovich, University of Texas at El Paso
- **A Computational-Experimental Study of the Plasma Processing of Carbides at High-Temperatures**
  Arturo Bronson, University of Texas at El Paso

11:30 a.m. **LUNCH (On Your Own)**

1:00 p.m. **SESSION 4 – ADVANCED MANUFACTURING MATERIALS**
Moderator – *Richard Dunst*, National Energy Technology Laboratory

- **Benefits Of Tailoring Hot Isostatic Pressure/Powdered Metal (HIP/PM) and Additive Manufacturing (AM) To Fabricate Advanced Energy System Components**
  Nancy Horton, Energy Industries of Ohio, Inc.
- **Additive Manufacturing for Cost Efficient Production of Compact Ceramic Heat Exchangers and Recuperators**
  Nicole Ross, Ceralink, Inc.
- **Design Optimization of Liquid Fueled High Velocity Oxy-Fuel Thermal Spraying Technique for Durable Coatings for Fossil Power Systems**
  Luisa Cabrera and Diaaeldin Mohamed, University of Texas at El Paso

2:30 p.m. **AFTERNOON BREAK – Grand Station 3, 4, & 5**

3:00 p.m. **SESSION 6 – COMPUTATIONAL MATERIALS**
Moderator – *Jason Hissam,* National Energy Technology Laboratory

- **Predicting Microstructure-Creep Resistance Correlation in High-Temperature Alloys Over Multiple Time Scales**
  Vikas Tomar, Purdue University
- **Novel Nano-Size Oxide Dispersion Strengthened Steels Development Through Computational and Experimental Study**
  Shizhong Yang, Southern University and A&M College

MONDAY APRIL 27

Track A High Performance Materials - Grand Station 1 & 2

3:00 p.m. **SESSION 6 – COMPUTATIONAL MATERIALS - CONTINUED**
Moderator – *Jason Hissam,* U.S. Department of Energy, National Energy Technology Laboratory

- **Synergistic Computational and Microstructural Design of Next-Generation High-Temperature Austenitic Stainless Steels**
  Raymundo Arroyave, Texas A&M Engineering Experiment Station
- **An Integrated Study on a Novel High Temperature High Entropy Alloy**
  Shizhong Yang, Southern University and A&M College

Track B Sensors & Controls and Simulation-Based Engineering - Admiral Room

10:30 a.m **SESSION 3 – SIMULATION-BASED ENGINEERING**
Moderator – *Steven Seachman*, National Energy Technology Laboratory

- **Engineered Complex Systems: Development of a Cloud-based Modeling Framework for Complex Advanced Power Systems**
  Kenneth "Mark" Bryden, Ames National Laboratory
- **Merged Environments for Simulation and Analysis: Building an Extensible Framework for Testing New Controls Algorithms**
  Paolo Pezzini, Ames National Laboratory

11:30 a.m. **LUNCH (On Your Own)**

1:00 p.m. **SESSION 5 – SIMULATION-BASED ENGINEERING**
Moderator – *Steven Seachman*, National Energy Technology Laboratory

- **Numerical Simulation of Polydisperse Gas-Particle Flow in a Vertical Riser with a Size-Velocity Quadrature-Based Moment Method**
  Bo Kong, Ames National Laboratory
- **Recent Advances in MFIX and Multiphase Flow Research**
  Mehrdad Shahnam, National Energy Technology Laboratory
- **Carbon Capture Simulation Initiative (CCSI)**
  David Miller, National Energy Technology Laboratory

2:30 p.m. **AFTERNOON BREAK – Grand Station 3, 4, & 5**

3:00 p.m. **SESSION 7 – SIMULATION-BASED ENGINEERING**
Moderator – *Mehrdad Shahnam,* National Energy Technology Laboratory

- **National Risk Assessment Partnership (NRAP)**
  Grant Bromhal, National Energy Technology Laboratory
- **Coal Combustion and Gasification Science**
  Ethan Hecht, Sandia National Laboratories
- **IPT - Direct Power Extraction**
  Rigel Woodside, National Energy Technology Laboratory

2015 CCR Project Review Meeting Agenda

TUESDAY APRIL 28

7:30 a.m **Registration– Grand Station 3 Foyer** **Continental Breakfast – Grand Station 3, 4, & 5**

Plenary Session 8 - Grand Station 1 & 2

8:30 a.m. **Dr. William Peter** - Deputy Director, ORNL Manufacturing Demonstration Facility
"Development in Additive Manufacturing for High Temp Alloys"

Mr. Bruce R. Geil, Associate Director for Budget and Operations, Sensors and Electron Devices Directorate (SEDD) - U.S. Army Research Laboratory
"Army Energy and Power Chanllenges, Perspectives, and Opportunities"

Mr. Erik Shuster - NETL Office of Performance and Benefits
"Benefits Analyses for Crosscutting Technology Research Program"

10:00 a.m. **MORNING BREAK – Grand Station 3, 4, & 5**

Track A High Performance Materials - Grand Station 1 & 2

10:30 a.m. **SESSION 9 – STRUCTURAL MATERIALS**
Moderator – *Jessica Mullen*, National Energy Technology Laboratory

- **Experimental and Computational Investigation of High Entropy Alloys for Elevated High-Temperature Applications**
  Peter Liaw, University of Tennessee, Knoxville
- **Serration Behavior of High-Entropy Alloys**
  Karin Dahmen, University Illinois at Urbana Champaign

11:30 a.m. **LUNCH (On Your Own)**

1:00 p.m. **SESSION 11 – FUNCTIONAL MATERIALS**
Moderator – *Jessica Mullen*, National Energy Technology Laboratory

- **Novel Functional-Gradient Thermal Barrier Coatings in Coal-Fired Power Plant Turbines**
  Jing Zhang, Indiana University - Purdue University Indianapolis
- **HVOF Thermal Spray TIC/TIB_2 Coatings of A-USC Boiler/ Turbine Components for Enhanced Corrosion Protection**
  Chung-Ying Tsai, Southern Illinois University, Carbondale
- **Reaction of Lanthanide Zirconate Pyrochlore Environmental Barrier Coating Materials in CMAS**
  Jeffrey Fergus, Auburn University

2:30 p.m. **AFTERNOON BREAK – Grand Station 3, 4, & 5**

3:00 p.m. **SESSION 13 – FUNCTIONAL MATERIALS**
Moderator – *Jason Hissam,* National Energy Technology Laboratory

- **Advanced Thermal Barrier Coatings for Next Generation Gas Turbine Engines Fueled by Coal-Derived Syngas**
  Nitin Padture, Brown University
- **Developing Novel Multifunctional Materials for High-Efficiency Electrical Energy Storage**
  Feng-Yuan Zhang, University of Tennessee, Knoxville

5:30 - 8:00 p.m **POSTER SESSION AND RECEPTION – Grand Station 3, 4, & 5**

TUESDAY APRIL 28

Track A High Performance Materials - Grand Station 1 & 2

3:00 p.m. **SESSION 13 – FUNCTIONAL MATERIALS - CONTINUED**
Moderator – *Jason Hissam,* U.S. Department of Energy, National Energy Technology Laboratory

- **Mixed-Oxides for Carbonaceous Fuel Conversion with Integrated CO_2 Capture via Chemical Looping with Oxygen Uncoupling (CLOU)**
  Fanxing Li, North Carolina State University
- **Novel Low Cost Environmentally Friendly Synthetic Approaches toward Core Shell Structured Micro-Particles for Fossil Energy Applications**
  Abu Kamara, Howard University

Track B Sensors & Controls and Simulation-Based Engineering - Admiral Room

10:30 a.m **SESSION 10 – SENSORS & CONTROLS HARSH ENVIRONMENT**
Moderator – *Barbara Carney*, National Energy Technology Laboratory

- **Ultra-High Temperature Thermionic Sensors**
  Scott Limb, Palo Alto Research Center
- **Harsh Environment SAW Wireless Sensor Array for Power Plant Applications**
  Mauricio Pereira da Cunha, University of Maine

11:30 a.m. **LUNCH (On Your Own)**

1:00 p.m. **SESSION 12 – SENSORS & CONTROLS**
Moderator – *Steven Seachman*, National Energy Technology Laboratory

- **An Information Theoretic Framework and Self-Organizing Agent-Based Sensor Network Architecture for Power Plant Condition Monitor**
  Richard Kolacinski, Case Western Reserve University
- **Model Based Sensor Placement for Component Condition Monitoring and Fault Diagnosis in Fossil Energy Systems**
  Debangsu Bhattacharyya, Texas Tech University
- **Evolving Robust and Reconfigurable Multi-Objective Controllers for Advanced Power Systems**
  Kagan Turner, Oregon State University.

2:30 p.m. **AFTERNOON BREAK – Grand Station 3, 4, & 5**

3:00 p.m. **SESSION 14 – SENSORS & CONTROLS**
Moderator – *Sydni Credle,* National Energy Technology Laboratory

- **Polymer-Derived Ceramic Wireless, Passive Strain Sensor for Turbine Engine Applications**
  Linan An, University of Central Florida
- **Graphene-Based Composite Sensors for Energy Applications**
  Charter Stinespring, West Virginia University
- **Advanced Ceramic Materials and Packaging Technologies for Realizing Sensors in Advanced Energy Generation Systems**
  Michael Usrey, Sporian Microsystems Inc.
- **Real-Time 3-D Volume Imaging and Mass-Gauging of High Temperature Flows and Power System Components in a Fossil Fuel Reactor Using Electrical Capacitance Volume Tomography**
  Qussai Marashdeh, Tech4Imaging, LLC

5:30 - 8:00 p.m **POSTER SESSION AND RECEPTION – Grand Station 3, 4, & 5**

2015 CCR Project Review Meeting Agenda

WEDNESDAY APRIL 29

7:30 a.m **Registration– Grand Station 3 Foyer** **Continental Breakfast – Grand Station 3, 4, & 5**

Track A High Performance Materials - Grand Station 1 & 2

8:30 A.m. **SESSION 15 – ADVANCED SUPERCRITICAL MATERIALS**
Moderator – *Vito Cedro*, National Energy Technology Laboratory

- **Advanced Ultra-Supercritical Materials Program**
  Robert Purgert and John Shingledecker, Energy Industries of Ohio
- **Ni-Based Alloys for Advanced Ultrasupercritical Steam Boilers**
  Peter Tortorelli, Oak Ridge National Laboratory

10:00 a.m. **MORNING BREAK – Grand Station 3, 4, & 5**

10:30 a.m. **SESSION 17 – ADVANCED SUPERCRITICAL MATERIALS**
Moderator – *Vito Cedro,* National Energy Technology Laboratory

- **Advanced Ultra-Supercritical Steam Cycle Turbine Materials**
  Phillip Maziasz, Oak Ridge National Laboratory
- **Addressing Materials Processing Issues for Ultra-Supercritical Steam Turbines**
  Paul Jablonski, National Energy Technology Laboratory

11:30 a.m. **LUNCH (On Your Own)**

1:00 p.m. **SESSION 19 – ADVANCED SUPERCRITICAL MATERIALS**
Moderator – *Vito Cedro,* National Energy Technology Laboratory

- **Component Test Facility (COMTEST) Phase 1 Engineering for 760°C (1400°F) Advanced Ultra-Supercritical Steam Generator Development**
  Paul Weitzel, Babcock & Wilcox Power Generation Group
- **Advanced Ultrasupercritical (A-USC) Tube Membrane Panel Development**
  James Pschirer, Alstom Power, Inc.
- **Advanced Ferritic 9% Cr Steel**
  Jeffrey Hawk, National Energy Technology Laboratory

2:30 p.m. **AFTERNOON BREAK – Grand Station 3, 4, & 5**

3:00 p.m. **SESSION 21 – COMPUTATIONAL MATERIALS**
Moderator – *Sydni Credle,* National Energy Technology Laboratory

- **ICME Based Computational Design of Advanced Alloys**
  Jiadong Gong, QuesTek Innovations, LLC
- **Computational and Experimental Development of Novel High Temperature Alloys**
  Matthew Kramer, Ames National Laboratory
- **Multiscale Design of Materials: Implementing a Basic Model Interface to Support the Rapid Use of Material's Models in Design**
  Richard LeSar, Ames National Laboratory
- **Large Scale Screening of Low-Cost Ferritic Steels for Advanced Ultra-Supercritical Boiler**
  Lizhi Ouyang, Tennessee State University

WEDNESDAY APRIL 29

Track B Sensors & Controls and Simulation-Based Engineering - Admiral Room

8:30 A.m. **SESSION 16 – SIMULATION-BASED ENGINEERING**
Moderator – *Jason Hissam,* National Energy Technology Laboratory

- **The Effect of Closure Laws on the Simulation Results of MFIX Two-Fluid Model of Gas-Solid Flows with Heat Transfer**
  Yifei Duan, University of Texas at San Antonio
- **Implementation and Refinement of a Comprehensive Model for Dense Granular Flows**
  Sankaran Sundaresan, Princeton University
- **Sensors Testing in Pressurized Combustion Facility at NETL**
  Benjamin Chorpening, National Energy Technology Laboratory

10:00 a.m. **MORNING BREAK – Grand Station 3, 4, & 5**

10:30 a.m. **SESSION 18 – SENSORS & CONTROLS HARSH ENVIRONMENT**
Moderator – *Barbara Carney*, National Energy Technology Laboratory

- **Thermal Energy Harvesting Plasmonics Based Chemical Sensors**
  Michael Carpenter, State University of New York Polytechnic Institute
- **Ultrasound Measurements of Temperature Distribution and Heat Fluxes in Solids**
  Mikhail Skliar, University of Utah

11:30 a.m. **LUNCH (On Your Own)**

1:00 p.m. **SESSION 20 – SENSORS & CONTROLS**
Moderator – *Steven Seachman*, National Energy Technology Laboratory

- **Intelligent Coordination of Heterogeneous Sensors in Advanced Power Systems**
  Mitchell Colby, Oregon State University
- **Multi-Objective Optimal Sensor Deployment Under Uncertainty for Advanced Power Systems**
  Urmila Diwekar, University of Illinois at Chicago
- **Development of Integrated Biomimetic Framework with Intelligent Monitoring, Cognition and Decision Capabilities for Control of Advanced Energy Plants**
  Debangsu Bhattacharyya, West Virginia University

2:30 p.m. **AFTERNOON BREAK – Grand Station 3, 4, & 5**

3:00 p.m. **SESSION 22 – SENSORS & CONTROLS**
Moderator – *Jessica Mullen,* National Energy Technology Laboratory

- **Metal Oxide-Based Heterostructured Nanowire Arrays for Ultra-Sensitive and Selective Multi-Mode High-Temperature Gas Detection**
  Pu-Xian Gao, University of Connecticut
- **Distributed Fiber Optic Sensor for On-line Monitoring of Coal Gasifier Refractory Health**
  Zhihao Yu, Virginia Polytechnic Institute and State University
- **Reduced Mode Sapphire Fiber and Distributed Sensing System**
  Daniel Homa, Virginia Polytechnic Institute and State University
- **Wireless Electrochemical Sensor to Monitor Hot Corrosion in Advanced Ultra-Supercritical Plants**
  Xingbo Liu, West Virginia University

2015 CCR Project Review Meeting Agenda

THURSDAY APRIL 30

7:30 a.m **Registration– Grand Station 3 Foyer** **Continental Breakfast – Grand Station 3, 4, & 5**

Track A High Performance Materials - Grand Station 1 & 2

8:30 A.m. **SESSION 23 – STRUCTURAL MATERIALS**
Moderator – *Richard Dunst*, National Energy Technology Laboratory

- **Corrosion Issues in Advanced Coal Fired Boilers**
  Bruce Pint, Oak Ridge National laboratory
- **Advanced Alloy Design Concepts for High-Temperature Fossil Energy Applications**
  Yukinori Yamamoto, Oak Ridge National laboratory
- **Gas Turbine Materials Life Assessment and Non-Destructive Evaluation**
  Jiangang Sun, Argonne National Laboratory

10:00 a.m. **MORNING BREAK – Grand Station 3,4, & 5**

10:30 a.m. **SESSION 25 – ADVANCED MANUFACTURING MATERIALS**
Moderator – *Vito Cedro,* National Energy Technology Laboratory

- **Solid State Joining of Creep Enhanced Ferritic Steel**
  Glenn Grant, Pacific Northwest National Laboratory
- **Low-Cost Fabrication of ODS Materials**
  Glenn Grant, Pacific Northwest National Laboratory

11:30 a.m. **LUNCH (On Your Own)**

1:00 p.m. **SESSION 27 – COMPUTATIONAL MATERIALS**
Moderator – *David Alman*, National Energy Technology Laboratory

- **Computational Modeling of Metal Oxidation at Elevated High Temperatures**
  Youhai Wen, National Energy Technology Laboratory
- **Creep-Fatigue-Oxidation Interactions: Predicting Alloy Lifetimes under Fossil Energy Service Conditions**
  Sebastien Dryepondt, Oak Ridge National laboratory
- **Weldability of Creep-Resistant Alloys for Advanced Fossil Power Plants**
  Xinghua Yu, Oak Ridge National laboratory

2:30 p.m. **AFTERNOON BREAK – Grand Station 3, 4, & 5**

3:00 p.m. **SESSION 29 – STRUCTURAL MATERIALS**
Moderator – *Jeffrey Hawk,* National Energy Technology Laboratory

- **Enhanced Entropy Superalloy Development For Fossil Energy Applications**
  Joseph Licavoli, National Energy Technology Laboratory
- **Effective Exploration of New 760 Degrees Celsius-Capability Steels for Coal Energy**
  Ji-Cheng Zhao, The Ohio State University
- **The Effects of Thermo-mechanical Treatments on the Microstructure and Mechanical Properties of Iron Based Superalloys**
  Bin Hu, Dartmouth College

THURSDAY APRIL 30

Track B Sensors & Controls and Simulation-Based Engineering - Admiral Room

8:30 A.m. **SESSION 24 – SIMULATION-BASED ENGINEERING**
Moderator – *Barbara Carney*, National Energy Technology Laboratory

- **Development of a CO_2 Chemical Sensor for Downhole CO_2 Monitoring in Carbon Sequestration**
  Ning Liu, New Mexico Institute of Mining & Technology
- **Robust Ceramic Coaxial Cable Down-Hole Sensors for Long-Term In Situ Monitoring of Geologic CO_2 Injection**
  Runar Nygaard, Missouri University of Science and Technology
- **Intrinsic Fiber Optic Chemical Sensors for Subsurface Detection of Carbon Dioxide**
  Jesus Delgado-Alonso, Intelligent Optical Systems Inc.

10:00 a.m. **MORNING BREAK – Grand Station 3,4, & 5**

10:30 a.m. **SESSION 26 – SENSORS & CONTROLS**
Moderator – *Barbara Carney*, National Energy Technology Laboratory

- **Novel Functional Sensors Materials Development for Advanced Fossil Power Generation and Carbon Captured Utilization and Storage**
  Paul Ohodnicki, National Energy Technology Laboratory
- **Investigation on Pyroelectric Ceramic Temperature Sensors for Energy System Applications**
  Yirong Lin, University of Texas at El Paso

11:30 a.m. **LUNCH (On Your Own)**

1:00 p.m. **SESSION 28 – ADVANCED MANUFACTURING SENSORS & CONTROLS**
Moderator – *Richard Dunst*, National Energy Technology Laboratory

- **Gallium Oxide Nanostructures for High-Temperature Sensors**
  Chintalapalle Ramana, University of Texas at El Paso
- **Additive Manufacturing Enabled Ubiquitous Sensing in Aerospace Systems**
  Joseph Mantese, United Technologies Research Center
- **Additive Manufacture of Smart Parts with Embedded Sensors for In-Situ Monitoring in Advanced Energy Systems**
  Hai Xiao, University of Missouri Systems

2:30 p.m. **AFTERNOON BREAK – Grand Station 3, 4, & 5**

3:00 p.m. **SESSION 30 – ADVANCED MANUFACTURING SENSORS & CONTROLS**
Moderator – *Sydni Credle,* National Energy Technology Laboratory

- **Embedded Active Fiber Optic Sensing Network for Structural Health Monitoring in Harsh Environments**
  Chennan Hu, Virginia Polytechnic Institute and State University
- **Investigation of "Smart Parts" with Embedded Sensors for Energy System Applications**
  Yirong Lin, University of Texas at El Paso
- **Smart Refractory Sensor Systems for Wireless Monitoring of Temperature, Health and Degradation of Slagging Gasifiers**
  Edward Sabolsky, West Virginia University
- **High-Temperature Sapphire Pressure Sensors for Harsh Environments**
  David Mills, University of Florida

2015 CCR Project Review Meeting Agenda

TUESDAY APRIL 28

5:30 - 8:00 p.m. Poster Presentations - Grand Station 3, 4, & 5

1 **Predicting the Oxidation/Corrosion Performance of Structural Alloys in Supercritical CO_2**
John P. Shingledecker, Electric Power Research Institute

2 **Modeling Long-Term Creep Performance for Welded Nickel-Base Superalloy Structures for Power Generation Systems**
Chen Shen, GE Global Research

3 **Additive Manufacturing of Fuel Injectors**
Mahdi Jamshidinia, Edison Welding Institute, Inc.

4 **Ceramic Microchannel Heat Exchangers**
Charles Lewinsohn, Ceramatec, Inc

5 **Computational Designing and Performance Prediction of Creep –Resistant Ferritic Superalloys**
Peter K. Liaw, The University of Tennessee at Knoxville

6 **Ceramic High-Temperature Thermoelectric Heat Exchanger and Heat Recuperators for Power Generations Systems**
Xueyan Song, West Virginia University

7 **Computational Design and Discovery of Ni-Based Alloys and Coatings: Thermodynamic Approaches Validated by Experiments**
Zi-Kui Liu, Pennsylvania State University

8 **Discrete Element Method for Deformation and Microstructure Evolution Modeling**
Jamie Kruzic, Oregon State University

9 **Nanosheet-Like Silica Nanomaterials (NSN) for Carbon Capture Applications**
Cheng-Yu Lai, Delaware State University

10 **Post-Combustion Carbon Capture Using Polyethylenimine Functionalized Titanate Nanotubes: Review and Preliminary Work**
Raghava Kommalapati, Prairie View A&M University

11 **Vertically-Aligned Carbon-Nanotubes Embedded in Ceramic Matrices for Hot Electrode Applications**
Yong Feng Lu, University of Nebraska – Lincoln

12 **Engineering Accessible Adsorption Sites in Metal Organic Frameworks for CO_2 Capture**
Conrad Ingram, Clark Atlanta University

13 **Smart Nano-Structured Titania-Based MEMS Multi-Gas Sensor for High Temperature and Harsh Fossil Environment Applications**
Payam Bozorgi, PIMEMS, Inc.and *Sebastien Dryepondt,* ORNL

14 **Adaptive Electrical Capacitance Volume Tomography for Real-Time Measurement of Solids Circulation Rate at High-Temperatures**
Qussai Marashdeh, Tech4Imaging, LLC

15 **Distributed Wireless Antenna Sensors for Boiler Condition Monitoring**
Haiying Huang, University of Texas at Arlington

16 **Robust Metal-Ceramic Coaxial Cable Sensors for Distributed Temperature Monitoring in Harsh Environments of Fossil Energy Power Systems**
Adam Trontz, University of Cincinnati

17 **Distributed Fiber Sensing Systems for 3D Combustion Temperature Field Monitoring in Coal-Fired Boilers Using Optically Generated Acoustic Waves**
Jingcheng Zhou, University of Massachusetts-Lowell

Poster Presentations (Continued) - Grand Station 3, 4, & 5

18 **The Hybrid Performance Project: Sensors and Controls Development through Cyber-Physical Simulation of Advanced Power Systems**
David Tucker, National Energy Technology Laboratory

19 **High-Temperature High-Velocity Direct Power Extraction Using an Open Cycle Oxy-Combustion System**
Manuel J. Hernandez, University of Texas at El Paso

20 **Boride Based Electrode Materials with Enhanced Stability under Extreme Conditions for MHD Direct Power Extraction**
Indrajit Charit, University of Idaho

21 **Precursor-Derived Nanostructured Si-C-X Materials for MHD Electrode Applications**
Yi-Hsun Yang, University of Washington

22 **Development of Reduced Order Model for Reacting Gas-Solids Flow using Proper Orthogonal Decomposition**
Paul Cizmas, Florida International University

23 **Water Desalination Using Multi-Phase Turbo-Expander**
Vitali Lissianski, General Electric Global Research

24 **Simultaneous Waste Heat and Water Recovery from Power Plant Flue Gases for Advanced Energy Systems**
Dexin Wang, Gas Technology Institute

25 **Field Demonstration Study for Heat and Water Recovery at a Coal-Fired Power Plant**
Todd Wall, Southern Company Services

26 **The COHO – An Efficient FO-based Carbon Capture and Water Reuse System for Power Plants**
Jennifer Klare, Proifera Inc.,

27 **Evaluating the Techno-Economic Feasibility of Forward Osmosis Processes Utilizing Low Grade Heat for Power Plant Water and Wastewater Treatment**
Meagan Mauter, Carnegie Mellon University

28 **Fouling-Resistant Membranes for Treating Concentrated Brines**
Zachery Hendren, Research Triangle Institute

29 **Treatment of Produced Water from Carbon Sequestration Sites for Water Reuse, Mineral Recovery and Carbon Utilization**
James H. Irvin, Southern Research Institute

30 **Development of Membrane Distillation Technology Utilizing Waste Heat for Treatment of High Salinity Wastewaters**
Omkar Lokare and Sakineh Tavakkoli, University of Pittsburgh

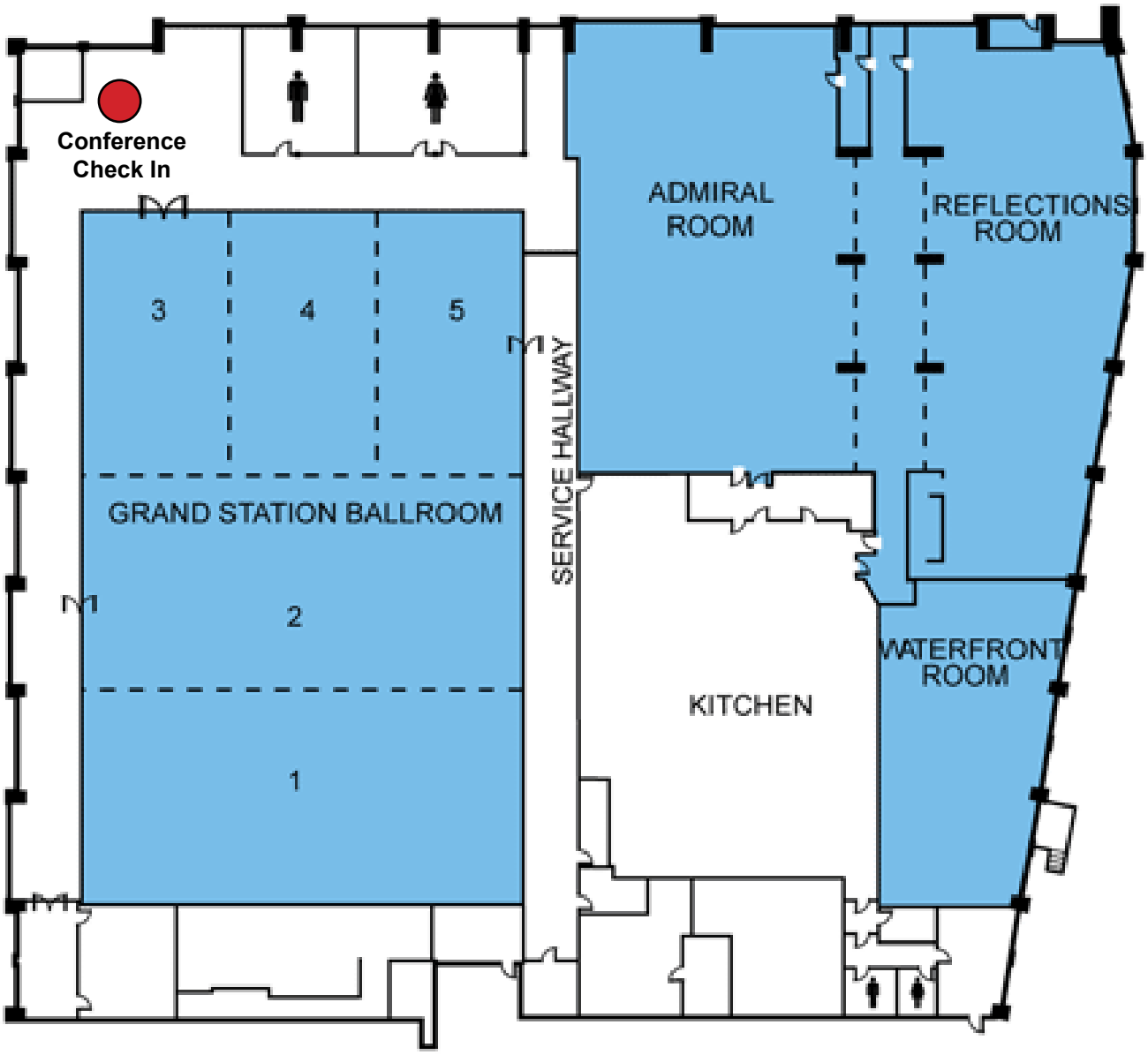
31 **An Integrated Supercritical System for Efficient Produced Water Treatment and Power Generation**
Seyed Dastgheib, Illinois State Geological Survey, University Illinois at Urbana-Champaign

32 **Exploring Energy-Waste Issues in the United States**
Vincent Tidwell, Sandia National Laboratories

33 **Joint Database for Energy and Propulsion Sensors**
Nicholas Keim and Ben Hill-Lam, John Hopkins University, Whiting School of Engineering

NOTES

SHERATION STATION SQUARE FLOOR PLAN



FIRST FLOOR

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